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UNITED STATES PATENT APPLICATION
FOR
CALENDAR-BASED CALLING AGENTS
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DESCRIPTION OF THE INVENTION**Related Applications**

[001] Applicants claim the right to priority under 35 U.S.C. § 119(e) based on Provisional Patent Application No. 60/272,122, entitled "VOICE MAIL INTEGRATION WITH INSTANT MESSENGER," filed February 27, 2001; Provisional Patent Application No. 60/272,167, entitled "DEVICE INDEPENDENT CALLER ID," filed February 27, 2001; Provisional Patent Application No. 60/275,667, entitled "CALENDAR CALLING AGENT," filed March 13, 2001; Provisional Patent Application No. 60/275,719, entitled "CALENDAR CALLING AGENT," filed March 13, 2001; Provisional Patent Application No. 60/275,020, entitled "METHOD AND APPARATUS FOR INTEGRATED BILLING VIA PDA," filed March 13, 2001; Provisional Patent Application No. 60/275,031, entitled "METHOD AND APPARATUS FOR UNIFIED COMMUNICATIONS MANAGER VIA INSTANT MESSAGING," filed March 13, 2001; and Provisional Patent Application No. 60/276,505, entitled "METHOD AND APPARATUS FOR CONTEXT BASED QUERYING," filed March 19, 2001, and all of which are expressly incorporated herein by reference in their entirety.

[002] The present application also relates to U.S. Patent Application No. (_____), entitled "VOICE MAIL INTEGRATION WITH INSTANT MESSENGER," Attorney Docket No. 01-1001; U.S. Patent Application No. (_____), entitled "DEVICE INDEPENDENT CALLER ID," Attorney Docket No. 01-1002; U.S. Patent Application No. (_____), entitled "METHOD AND APPARATUS FOR A UNIFIED COMMUNICATION MANAGEMENT VIA INSTANT MESSAGING," Attorney Docket No. 01-1004; U.S. Patent Application No. (_____), entitled "METHOD AND

APPARATUS FOR CONTEXT BASED QUERYING," Attorney Docket No. 01-1005; U.S. Patent Application No. (_____), entitled "METHOD AND APPARATUS FOR CALENDARED COMMUNICATIONS FLOW CONTROL," Attorney Docket No. 01-1007; U.S. Patent Application No. (_____), entitled "METHOD AND APPARATUS FOR INTEGRATED BILLING VIA PDA," Attorney Docket No. 01-1010; and U.S. Patent Application No. (_____), entitled "METHOD AND APPARATUS FOR DIAL STREAM ANALYSIS," Attorney Docket No. 01-1013, and all of which are expressly incorporated herein by reference in their entirety.

Field of the Invention

[003] The present invention relates to voice telephony calling systems.

Background of the Invention

[004] Electronic calendars have been a part of electronic mail ("e-mail") systems and general office automation software, and now are becoming standard on cell phones and personal digital assistants. For example, the Microsoft™ Outlook™ system incorporates an electronic calendar capable of assisting with the scheduling of appointments, and generating alerts at appropriate times based on scheduled appointments and events. In addition, known calendar systems store contact information, such as telephone numbers.

[005] Unfortunately, known calendar systems are not capable of interfacing with a voice telecommunications network, such as the public switched telephone network ("PSTN"). Although known calendar systems may alert a person of a scheduled appointment, a person must separately interface with the PSTN. Therefore,

there is a need in the art to provide an interface with a voice telecommunications system which is integrated with a calendar.

[006] Accordingly, it would be desirable to provide methods, apparatus, and systems which overcome these and other shortcomings of the prior art.

SUMMARY OF THE INVENTION

[007] A method, system, apparatus and computer readable medium consistent with the present invention connect a call between a user and one or more parties in a telephone network by receiving, via a data network, event data associated with the user, the event data comprising information for connecting a call to the one or more parties and a time period for connecting the call; storing the event data in a database; and establishing the call between the user and the one or more parties via the telephone network based on the event data.

[008] A method, system, apparatus and computer readable medium consistent with the present invention connect a call between a user and at least one party using an electronic calendar system having a capacity to record by establishing at least one event record corresponding to the call, the event record comprising user information and at least one telephone identifier; associating the event record with an event time; requesting an indication from the user, based on a current time and the event time; and initiating the call, based on an affirmative indication from the user.

[009] It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory only and are not restrictive of the invention, as claimed.

BRIEF DESCRIPTION OF THE DRAWINGS

[010] The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate embodiments of the invention and together with the description, serve to explain the principles of the invention. In the drawings,

[011] Fig. 1 is a block diagram of a data processing and telecommunications environment, in accordance with methods and apparatus consistent with the principles of the present invention;

[012] Fig. 2 is a block diagram of a data terminal, in accordance with methods and apparatus consistent with the principles of the present invention;

[013] Fig. 3 illustrates an exemplary screen of a calendar system, in accordance with methods and apparatus consistent with the principles of the present invention;

[014] Fig. 4 is a block diagram of a service center, in accordance with methods and apparatus consistent with the principles of the present invention;

[015] Figure 5 illustrates an event table, in accordance with methods and apparatus consistent with the principles of the present invention;

[016] Fig. 6 is a block diagram of a voice network, in accordance with methods and apparatus consistent with the principles of the present invention; and

[017] Fig. 7 is a flow diagram illustrating a process for forwarding communications, in accordance with methods and apparatus consistent with the principles of the present invention.

DETAILED DESCRIPTION

[018] Methods and systems integrate voice telephony services and a calendar application. The user may specify event data in the calendar. The event data

comprises information for connecting a call with the one or more parties and a time period. Based on the event data in a database, phone calls are established based on phone numbers in the event data and the time period.

[019] Reference will now be made in detail to exemplary embodiments of the present invention, examples of which are illustrated in the accompanying drawings. Wherever possible, the same reference numbers will be used throughout the drawings to refer to the same or like parts.

[020] Fig. 1 is a block diagram of a data processing and telecommunications environment, in accordance with methods and apparatus consistent with the principles of the present invention. The data processing and telecommunications environment 100 may include a data network 102, a voice network 104, a service center 106, and a service center database 108. As shown, a user 110 may use a data terminal 112 to interface data network 102. In addition, user 110 may use phones 114, 116, and 118 to interface with voice network 104. For example, calling party 120 may use phone 122 to call user 110 at any one of phones 114, 116, and 118.

[021] Data network 102 provides communications between the various entities depicted in environment 100 of Fig. 1, such as data terminal 112 and service center 106. Data network 102 may be a shared, public, or private network and encompass a wide area or local area. For example, data network 102 may be implemented on a network, such as the Internet.

[022] Voice network 104 provides telephony services, for example, to allow a phone call between calling party 120 and user 110. For example, voice network 104 may be implemented using a network, such as the Public Switched Telephone Network

("PSTN"). Alternatively, voice network 104 may be implemented using voice-over Internet Protocol ("VoIP") technology. In addition, voice network 104 may be implemented using both the PSTN and VoIP technology consistent with the principles of the present invention. Voice network 104 is described in further detail with reference to Fig. 6.

[023] Service center 106 provides a platform for managing communications over data network 102 and voice network 104. In addition, service center 106 provides gateway functions, such as code and protocol conversions, to transfer communications between data network 102 and voice network 104. Service center 106 may be implemented using a combination of hardware and software. For example, service center 106 may be implemented using a plurality of a general purpose computers or servers coupled by a network (not shown). Although service center 106 is shown with direct connections to data network 102 and voice network 104, any number and type of network elements may be interposed between service center 106, data network 102, and voice network 104. Service center 106 is described in further detail with reference to Fig. 4.

[024] Service center database 108 contains information regarding user 110. For example, service center database 108 may contain information including, an identifier for user 110, a password, one or more email addresses for user 110, one or more instant messaging identifiers for user 110, and one or more telephone numbers, such as for phones 114, 116, and 118. Service center database 108 may be implemented as an Oracle™ database using a combination of known hardware and software, such as Proliant™ servers and EMC storage devices.

[025] Data terminal 112 provides user 110 an interface to data network 102.

For example, data terminal 112 may be implemented using any device capable of accessing the Internet, such as a general purpose computer or personal computer equipped with a modem. Data terminal 112 may also be implemented in other devices, such as the Blackberry™, and Ergo Audrey™. Furthermore, data terminal 112 may be implemented in wireless devices, such as pagers, mobile phones (with data access functions), and Personal Digital Assistants ("PDA") with network connections.

[026] Data terminal 112 also allows user 110 to communicate with service center 106. For example, user 110 may use instant messaging ("IM") to communicate with service center 106. IM is a communications service implemented over the Transmission Control Protocol and Internet Protocol ("TCP/IP") suite to create a private communication channel. Although there is no accepted universal IM standard, an appropriate IM model may be found in RFC 2778, M. Day et al., The Internet Society (2000), titled "A Model for Presence and Instant Messaging," which describes, *inter alia*, a model for providing instant messaging services. There are several known IM systems including America OnLine Instant Messenger ("AIM") and Microsoft Network Messenger Service ("MSNMS"). In addition to IM services, data terminal 112 may use other aspects of TCP/IP including the hypertext transfer protocol ("HTTP"); the user datagram protocol ("UDP"); the file transfer protocol ("FTP"); the hypertext markup language ("HTML"); and the extensible markup language ("XML").

[027] Data terminal 112 may communicate directly with service center 106. For example, a client application 218 as drawn in Fig. 2 may be installed on data terminal 112, which directly communicates with service center 106. Alternatively, data terminal

112 may communicate with service center 106 via proxy 124. Data terminal 112 is described in further detail with reference to Fig. 2.

[028] Proxy 124 provides an intermediate communications service for data terminal 112 and service center 106. Proxy 124 may act on behalf of user 110 to interface service center 106 and provides functions, such as authentication services, and protocol translation services. For example, user 110 may be a MSNMS subscriber and proxy 124 may be a MSNMS server. User 110 may then use MSNMS IM services to indirectly interface service center 106. As another example, proxy 124 may be a web site. User 110 may provide information, such as information for call appointments, to proxy 124 via web pages and secured using secured sockets layer ("SSL"). Proxy 124 may then establish an SSL session with service 106 and provide the information from user 110.

[029] Phones 114, 116, 118, and 122 interface voice network 104. Phones 114, 116, 118, and 122 may be implemented using known devices, including wireline phones and mobile phones, such as wireless phones. Although phones 114, 116, 118, and 122 are shown directly connected to voice network 104, any number of intervening elements, such as a private branch exchange ("PBX"), may be interposed between phones 114, 116, 118, and 122 and voice network 104.

[030] Fig. 2 is a block diagram of a data terminal, in accordance with methods and apparatus consistent with the principles of the present invention. As shown, data terminal 112 includes a central processing unit (CPU) 200, a memory 202, a storage module 204, a network interface 206, an input interface 208, an output interface 210, an input device 216, and an output device 218.

[031] CPU 200 provides control and processing functions for data terminal 112. Although Fig. 2 illustrates a single CPU, data terminal 112 may include multiple CPUs. CPU 200 may also include, for example, one or more of the following: a co-processor, memory, registers, and other processing devices and systems as appropriate. For example, CPU 200 may be implemented using a Pentium™ processor provided from Intel Corporation.

[032] Memory 202 provides a primary memory for CPU 200, such as for program code. Memory 202 may be embodied with a variety of components of subsystems, including, a random access memory ("RAM"), and a read-only memory ("ROM"). For example, when data terminal 112 executes an application installed in storage module 204, CPU 200 may download at least a portion of the program code from storage module 204 into memory 308. As CPU 200 executes the program code, CPU 200 may also retrieve additional portions of program code from storage module 204.

[033] Storage module 204 provides mass storage for data terminal 112. Storage module 204 may be implemented with a variety of components or subsystems including, for example, a hard drive, an optical drive, a general-purpose storage device, a removable storage device, and/or other devices capable of storing information. Further, although storage module 204 is shown within data terminal 112, storage module 204 may be implemented external to data terminal 112.

[034] Storage module 204 includes program code and information for data terminal 112 to communicate with service center 106. Storage module 204 includes program code for a calendar application 220, such as GroupWise provided by Novell

Corporation, or Outlook provided by Microsoft Corporation; a client application 218, such as a MSNMS client, or AIM client; and an Operating System (OS) 216, such as the Windows Operation System provided by Microsoft Corporation. In addition, storage module 204 may include other program code and information (not shown), such as program code for TCP/IP communications; kernel and device drivers; configuration information, such as a Dynamic Host Configuration Protocol (DHCP) configuration; a web browser, such as Internet Explorer provided by Microsoft Corporation, or Netscape Navigator provided by Netscape Corporation; and any other software that may be installed on data terminal 112.

[035] Network interface 206 provides a communications interface between data terminal 112 and data network 102. Network interface 206 may receive and transmit communications for data terminal 112. For example, network interface 206 may be a modem, or a local area network ("LAN") port.

[036] Input interface 208 receives input from user 110 via input device 212 and provides the input to CPU 200. Input device 212 may include, for example, a keyboard, a microphone, and a mouse. Other types of input devices may also be implemented consistent with the principles of the present invention.

[037] Output interface 210 provides information to user 110 via output device 214. Output device 214 may include, for example, a display, a printer, and a speaker. Other types of output devices may also be implemented consistent with the principles of the present invention.

[038] Fig. 3 illustrates an exemplary screen of a calendar system, in accordance with methods and apparatus consistent with the principles of the present invention. For

example, calendar interface 300 includes a time section 302, an appointments section 304, and a phone number section 306. As shown in Fig. 3, user 110 has scheduled a phone call (client meeting) at phone number "870 555 1234 at 8:00 AM. In addition, user 110 has scheduled a conference call at phone number "888 555 1234" with a code of "1234" at noon time.

[039] Fig. 4 is a block diagram of a service center, in accordance with methods and apparatus consistent with the principles of the present invention. As shown, service center 106 includes firewalls 400 and 402, a data interface server 404, a management server 406, a voice interface server 408, a calendar server 410, and a dialing server 412.

[040] Firewalls 400 and 402 provide security services for communications between service center 106 and data network 102, and between service center 106 and voice network 104, respectively. For example, firewalls 400 and 402 may restrict communications between data terminal 112 and one or more servers within service center 106. Any security policy may be implemented in firewalls 400 and 402 consistent with the principles of the present invention. Firewalls 400 and 402 may be implemented using a combination of known hardware and software, such as the Raptor Firewall provided by the Axent Corporation. Furthermore, firewalls 400 and 402 may be implemented as separate machines within service center 106, or implemented on one or more machines external to service center 106.

[041] Data interface server 404 provides interface services between service center 106 and data terminal 112. For example, data interface server 404 may exchange TCP/IP communications, such as IM communications or XML information

which include call appointment information from user 110. Data interface server 404 may also interface proxy 124 to indirectly exchange communications with data terminal 112.

[042] Management server 406 controls operation of service center 106 and provides access services to service center database 108. For example, management server 406 may store information, such as call appointments, received from data interface server 404 into service center database 108. Management server 406 may also service queries to service center database 108, for example, from data interface server 404 or voice interface server 408.

[043] Voice interface server 408 provides interface services between service center 106 and voice network 104. For example, voice interface server 408 may exchange information, such as call appointments, between service center database 108 and voice network 104. Voice interface server 408 may provide the information to voice network 104 using one or more protocols. For example, voice interface server 408 may use TCP/IP, or the Signaling System 7 ("SS7") protocol.

[044] SS7 is a telecommunications protocol defined by the International Telecommunication Union ("ITU"). SS7 is an "out-of-band" signaling protocol using a system of nodes called Service Switching Points ("SSP"), Signal Transfer Points ("STP"), and Service Control Points ("SCP"). "Out-of-band signaling" is signaling that does not take place over the same path between switching elements as the connection, and instead uses separate digital channels between SS7 nodes. SS7 allows voice network 104 to provide enhanced functions, such as call forwarding; caller-ID; three-

way calling; wireless services such as roaming and mobile subscriber authentication; local number portability; and toll-free/toll services.

[045] Calendar server 410 provides services to calendar application 220 on data terminal 112. For example, calendar server 410 may provide email services, directory services, and calendar information, such as schedule information, to data terminal 112. Calendar server 410 may operate in conjunction with data interface server 404 to exchange, for example, call appointments with data terminal 112.

[046] Dialing server 412 allows service center 106 to initiate telephone calls on behalf of user 110. Dialing server 412 may interface voice network 104 via voice interface server 408. Alternatively, dialing server 412 may interface with voice network 104 directly. For example, service center 104 may provide dialing server 412 a connection to an element within voice network 104, such as SSP 606.

[047] Alternatively, if voice network 104 is implemented using a VoIP network, then dialing server 412 may use TCP/IP protocols, such as, the H.323 protocol. The H.323 standard from ITU-T is a version of the H.320 Multimedia-over-ISDN standard optimized for packet-based networks, such as TCP/IP based networks.

[048] Dialing server 412 may be implemented using known hardware and software, such as a telephony interface provided by Dialogic™. Dialing server 412 may also be implemented on other platforms, such as the AlphaServer Intelligent Peripheral Platform provided by Compaq Corporation.

[049] Furthermore, as another alternative, dialing server 412 may be implemented within data terminal 112, such as software within storage 204. For example, data terminal 112 may be a mobile phone or include a telephony interface,

such as in a modem. Accordingly, dialing server 412 may operate in conjunction with calendar application 220 to provide initiate a telephone call on behalf of user 110.

[050] Although Fig. 4 shows separate servers within service center 106, service center 106 may be implemented using any combination of hardware and software. For example, service center 106 may implement data interface server 404, management server 406, voice interface server 408, calendar server 410, and dialing server 412 as software applications installed on a single machine. In addition, service center 106 may access one or more servers remotely across a network.

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[051] Figure 5 illustrates an event table in accordance with methods and apparatus consistent with the principles of the present invention. Event table 350 illustrates the type of information that may be stored in service center 106. Each line of event table 350, such as element 360, represents an event record within an event table. For example, event record 360 may correspond with screen 300 to represent a call to telephone number "(870) 555-1234" at 8:00 AM. In addition, event record 370 shows that a conference call is scheduled at phone number (888) 555-1234 with a pass number 12345 at 12:00 PM. Management server 406 may provide event record 360 to dialing server 412 to initiate a phone call between user 110 and, for example, called party 120. *Fig. 1 calling party*

[052] Fig. 6 is a block diagram of a voice network, in accordance with methods and apparatus consistent with the principles of the present invention. As shown, voice network 104 includes a service control point ("SCP") 600, service transfer points ("STP") 602 and 604, service switching points ("SSP") 606, 608, 610, and 612, and a configuration database 614.

[053] Voice network 104 may be implemented using the PSTN and SS7 as a signaling protocol. As noted above, the SS7 protocols allows voice network 104 to provide features, such as call forwarding; caller-ID; three-way calling; wireless services such as roaming and mobile subscriber authentication; local number portability; and toll-free/toll services. The SS7 protocol provides various types of messages to support the features of voice network 104. For example, these SS7 messages may include Transaction Capabilities Applications Part ("TCAP") messages to support event "triggers," and queries and responses between SCP 600 and SSPs 606, 608, 610, and 612.

[054] SCP 600 provides interface services into configuration database 614 related to processing of calls within voice network 104, and interface services between voice interface server 408. SCP 600 provides translation and routing services of SS7 messages to support the features of voice network 104, such as call forwarding. In addition, SCP 600 may exchange information voice interface server 408 in service center 106 using TCP/IP or SS7. For example, SCP 600 may receive configuration information from voice interface terminal 408 which requests one or more call appointments in voice network 104. SCP 600 may then configure the call appointments in voice network 104 using one or more SS7 messages, such as TCAP messages, to set triggers in SSPs 606, 608, 610, and 612.

[055] SCP 600 may be implemented using a combination of known hardware and software. Although SCP 600 is shown with a direct connection to service center 106, any number of network elements including routers, switches, hubs, etc. may be used to connect SCP 600 and service center 106.

[056] STPs 602 and 604 relay SS7 messages within voice network 104. For example, STP 602 may route SS7 messages between SSPs 606, 608, 610, and 612. STP 602 and 604 may be integrated as adjunct to an SSP, e.g., SSPs 606, 608, 610, and 612, or may be implemented as a separate machine. In addition, STP 602 and 604 may provide security functions, such as security checks on incoming/outgoing SS7 messages. STP 602 may also provide other functions, such as acquisition and storage of traffic/usage statistics. STP 602 may be implemented using known hardware and software from manufacturers such as NORTEL™ and LUCENT Technologies™.

[057] SSPs 606, 608, 610, and 612 provide an interface between voice network 104 and phones 114, 116, 118, and 122, respectively, to setup, manage, and release telephone calls within voice network 104. SSPs 606, 608, 610, and 612 may be implemented as a voice switch, an SS7 switch, or a computer connected to a switch. SSPs 606, 608, 610, and 612 exchange SS7 signal units to support a telephone call between called party 120 and user 110. For example, SSPs 606, 608, 610, and 612 may exchange SS7 messages, such as TCAP messages, within message signal units ("MSU") to control calls, perform database queries to configuration database 614, and provide maintenance information.

[058] Configuration database 614 comprises one or more known databases to support the features of voice network 104. For example, configuration database 614 may include a call management service database; a line information database (LIDB); a business services database; a home location register; and a visitor location register.

[059] Figure 7 is a flow diagram illustrating steps of a method consistent with the present invention for initiating a telecommunications call via an electronic calendar. The

calendar system receives an event record (step 702). An event record stores appointment details such as an appointment for a telephone call or a telephone conference involving another party, also called a "voice call event." For example, user 110 may enter an event into calendar application 220.

[060] Once an event record is established, calendar application 220 may store the event record locally in storage 204 and/or store the event record in calendar server 410 (step 704). The event record may also be stored in service center database 108. Storing the event record facilitates comparison of the event record with time events and the current time as indicated by a time keeping device, such as a real-time clock.

[061] Based on the event record, calendar server 410 associates an event record with an event time (step 706). For example, based on event table 350, calendar server 410 may associate 8:00 AM for event record 360.

[062] Calendar server 410 may then checks if it is time to send a notification (step 707). If it is not yet time, calendar server 410 wait until the current time is equal to the event time associated with an event record (step 708).

[063] When current time equals an event time, or when current time is within a predetermined range of the event time, calendar server 410 causes management server 406 to send user 110 a notification message (step 709). For example, management server 406 may direct data interface server 404 to send an IM to user 110. The notification message may include information regarding the event, such as the information identifying the called party or calling party, time, and phone number. The notification message may include other information, such as information identifying other parties involved, a request for authorization to make the connection, verification of

the identity of the user. In addition, the notification message may be sent to other parties who are also scheduled for the appointment.

[064] Service center 106 then determines whether user 110 provided an affirmative indication to the notification message (step 710). If user 110 does not provide an affirmative indication, then the process may end, for example, with establishing a call on behalf of user 110.

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[065] If user 110 provides an affirmative indication, then service center 106 may initiate and establish a call on behalf a user 110 (step 712). After receiving an affirmative indication, management server 406 may provide information from event table 350 to dialing server 412. Management server 406 may also provide one or more phone numbers for user 110, such as phone numbers for phones 114, 116, and 118. Dialing server may then initiate a call based on the event record, such as event records 360 and 370.

[066] Other embodiments of the invention will be apparent to those skilled in the art from consideration of the specification and practice of the invention disclosed herein. It is intended that the specification and examples be considered as exemplary only.